

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended): An actuator for a pickup, comprising:

a fixed portion;

a movable portion designed to be movable in each of a focusing direction extending along an optical axis of an objective lens and a tracking direction substantially perpendicular to the focusing direction, due to a driving force transmitted from a drive portion, for holding the objective lens; and

a plurality of linear elastic members of five or more each having ends connected to the movable portion and the fixed portion, respectively, wherein

the plurality of the linear elastic members is equal to one another in length dimension between the fixed portion and the movable portion,

the ends of the plurality of the linear elastic members are located on a virtual circle formed on a plane by being projected onto a plane including both the focusing direction and the tracking direction,

the virtual circle has a center defined as a rolling center with which a center of translational forces of the linear elastic members coincides, and

at least one of a center of gravity of the movable portion and a center of a driving force of the movable portion coincides with the rolling center.

Claim 2 (Previously Presented): An actuator for a pickup comprising:

a fixed portion;

a movable portion designed to be movable in each of a focusing direction extending along an optical axis of an objective lens and a tracking direction substantially perpendicular to the focusing direction, due to a driving force transmitted from a drive portion, for holding the objective lens; and

a plurality of linear elastic members of five or more each having ends connected to the movable portion and the fixed portion, respectively, wherein:

the plurality of the linear elastic members is equal to one another in length dimension between the fixed portion and the movable portion,

the ends of the plurality of the linear elastic members are located on a virtual circle formed on a plane by being projected onto a plane including both the focusing direction and the tracking direction, and

the virtual circle has a center defined as a rolling center, which coincides with a center of translational forces of the linear elastic members, a center of gravity of the movable portion, and a center of a driving force of the movable portion.

Claim 3 (Previously Presented): The actuator for the pickup according to claim 1, wherein

the linear elastic members include six linear elastic members,

the linear elastic members are disposed laterally symmetrically across the rolling center in the tracking direction, and

the linear elastic members which are adjacent to one another in a direction parallel to the tracking direction satisfy a relationship of $K_C \times C + K_A \times A = K_B \times B$ when the linear elastic members close to the rolling center are disposed on one side of the focusing direction, and a relationship of $K_A \times A = K_C \times C + K_B \times B$ when the linear elastic members close to the rolling center are disposed on another side of the focusing direction, given that line segments drawn from the rolling center onto line segments linking the ends of the linear elastic members with each other have length dimensions A, C, and B and moduli of elasticity K_A , K_C , and K_B , respectively, sequentially in the focusing direction.

Claim 4 (Previously Presented): The actuator for the pickup according to Claim 2, wherein

the linear elastic members include six linear elastic members,

the linear elastic members are disposed laterally symmetrically across the rolling center in the tracking direction, and

the linear elastic members which are adjacent to one another in a direction parallel to the tracking direction satisfy a relationship of $K_C \times C + K_A \times A = K_B \times B$ when the linear elastic members close to the rolling center are disposed on one side of the focusing direction, and a relationship of $K_A \times A = K_C \times C + K_B \times B$ when the linear elastic members close to the rolling center are disposed on another side of the focusing direction, given that line segments drawn from the rolling center onto line segments linking the ends of the linear elastic members with each other have length dimensions A, C, and B and moduli of elasticity K_A , K_C , and K_B , respectively, sequentially in the focusing direction.

Claim 5 (Withdrawn): An actuator for a pickup, comprising:

a fixed portion;

a movable portion designed to be movable in each of a focusing direction extending along an optical axis of an objective lens and in a tracking direction substantially perpendicular to the focusing direction, due to a driving force transmitted from a drive portion, for holding the objective lens; and

four linear elastic members each having ends connected to the movable portion and the fixed portion, respectively, wherein

the ends of the four linear elastic members are located on a virtual circle formed on a plane by being projected onto a plane including both the focusing direction and the tracking direction,

the ends are linked with one another by line segments constituting substantially a trapezoidal shape, and

the virtual circle has a center defined as a rolling center, which coincides with at least one of a center of gravity of the movable portion, a center of a driving force of the movable portion, and a center of translational forces of the linear elastic members.

Claim 6 (Withdrawn): The actuator for the pickup according to Claim 5, wherein

the four linear elastic members are composed of the two linear elastic members linked with each other by a line segment constituting an upper base of the trapezoidal shape, and two

linear elastic members linked with each other by a line segment constituting a lower base of the trapezoidal shape, and

the former two linear elastic members are different in cross-sectional area from the latter two linear elastic members.

Claim 7 (Withdrawn): The actuator for the pickup according to Claim 6, wherein the two linear members linked with each other by the line segment constituting the upper base of the trapezoidal shape are different in cross-sectional width dimension from the two linear elastic members linked with each other by the line segment constituting the lower base of the trapezoidal shape.

Claim 8 (Withdrawn): The actuator for the pickup according to Claim 5, wherein the four linear elastic members are composed of two linear elastic members linked with each other by a line segment constituting an upper base of the trapezoidal shape, and two linear elastic members linked with each other by a line segment constituting a lower base of the trapezoidal shape, and

the former two linear elastic members are different in modulus of elasticity from the latter two linear elastic members.

Claim 9 (Previously Presented): A pickup device, comprising:

an actuator for a pickup; and

an actuator drive portion for driving the actuator for the pickup, wherein

the actuator for the pickup includes: a fixed portion; a movable portion designed to be movable in each of a focusing direction extending along an optical axis of an objective lens and a tracking direction substantially perpendicular to the focusing direction, due to a driving force transmitted from a drive portion, for holding the objective lens; and a plurality of linear elastic members of five or more each having ends connected to the movable portion and the fixed portion, respectively,

the plurality of the linear elastic members is equal to one another in length dimension between the fixed portion and the movable portion,

the ends of the plurality of the linear elastic members are located on a virtual circle formed on a plane by being projected onto a plane including both the focusing direction and the tracking direction,

the virtual circle has a center defined as a rolling center with which a center of translational forces of the linear elastic members coincides, and

at least one of a center of gravity of the movable portion and a center of a driving force of the movable portion coincides with the rolling center.

Claim 10 (Previously Presented): A pickup device, comprising:

an actuator for a pickup; and

an actuator drive portion for driving the actuator for the pickup, wherein

the actuator for the pickup includes: a fixed portion; a movable portion designed to be movable in each of a focusing direction extending along an optical axis of an objective lens and a tracking direction substantially perpendicular to the focusing direction, due to a driving force

transmitted from a drive portion, for holding the objective lens; and a plurality of linear elastic members of five or more each having ends connected to the movable portion and the fixed portion, respectively,

the plurality of the linear elastic members is equal to one another in length dimension between the fixed portion and the movable portion,

the ends of the plurality of the linear elastic members are located on a virtual circle formed on a plane by being projected onto a plane including both the focusing direction and the tracking direction, and

the virtual circle has a center defined as a rolling center, which coincides with a center of translational forces of the linear elastic members, a center of gravity of the movable portion, and a center of a driving force of the movable portion.

Claim 11 (Withdrawn): A pickup device, comprising:

an actuator for a pickup; and

an actuator drive portion for driving the actuator for the pickup, wherein

the actuator for the pickup includes: a fixed portion; a movable portion designed to be movable in each of a focusing direction extending along an optical axis of an objective lens and in a tracking direction substantially perpendicular to the focusing direction, due to a driving force transmitted from a drive portion, for holding the objective lens; and four linear elastic members each having ends connected to the movable portion and the fixed portion, respectively,

the ends of the four linear elastic members are located on a virtual circle formed on a plane by being projected onto a plane including both the focusing direction and the tracking direction,

the ends are linked with one another by line segments constituting substantially a trapezoidal shape, and

the virtual circle has a center defined as a rolling center, which coincides with at least one of a center of gravity of the movable portion, a center of a driving force of the movable portion, and a center of translational forces of the linear elastic members.

Claim 12 (Previously Presented): A recording medium drive device, comprising:

a pickup device including: an actuator for a pickup; and

an actuator drive portion for driving the actuator for the pickup, wherein

the actuator for the pickup includes: a fixed portion; a movable portion designed to be movable in each of a focusing direction extending along an optical axis of an objective lens and a tracking direction substantially perpendicular to the focusing direction, due to a driving force transmitted from a drive portion, for holding the objective lens; and a plurality of linear elastic members of five or more each having ends connected to the movable portion and the fixed portion, respectively,

the plurality of the linear elastic members is equal to one another in length dimension between the fixed portion and the movable portion,

the ends of the plurality of the linear elastic members are located on a virtual circle formed on a plane by being projected onto a plane including both the focusing direction and the tracking direction,

the virtual circle has a center defined as a rolling center with which a center of translational forces of the linear elastic members coincides, and

at least one of a center of gravity of the movable portion and a center of a driving force of the movable portion coincides with the rolling center.

Claim 13 (Previously Presented): A recording medium drive device, comprising:

a pickup device including: an actuator for a pickup; and an actuator drive portion for driving the actuator for the pickup, wherein

the actuator for the pickup includes: a fixed portion; a movable portion designed to be movable in each of a focusing direction extending along an optical axis of an objective lens and a tracking direction substantially perpendicular to the focusing direction, due to a driving force transmitted from a drive portion, for holding the objective lens; and a plurality of linear elastic members of five or more each having ends connected to the movable portion and the fixed portion, respectively,

the plurality of the linear elastic members is equal to one another in length dimension between the fixed portion and the movable portion,

the ends of the plurality of the linear elastic members are located on a virtual circle formed on a plane by being projected onto a plane including both the focusing direction and the tracking direction, and

the virtual circle has a center defined as a rolling center, which coincides with a center of translational forces of the linear elastic members, a center of gravity of the movable portion, and a center of a driving force of the movable portion.

Claim 14 (Withdrawn): A recording medium drive device, comprising:

a pickup device including: an actuator for a pickup; and an actuator drive portion for driving the actuator for the pickup, wherein

the actuator for the pickup includes: a fixed portion; a movable portion designed to be movable in each of a focusing direction extending along an optical axis of an objective lens and in a tracking direction substantially perpendicular to the focusing direction, due to a driving force transmitted from a drive portion, for holding the objective lens; and four linear elastic members each having ends connected to the movable portion and the fixed portion, respectively,

the ends of the four linear elastic members are located on a virtual circle formed on a plane by being projected onto a plane including both the focusing direction and the tracking direction,

the ends are linked with one another by line segments constituting substantially a trapezoidal shape, and

the virtual circle has a center defined as a rolling center, which coincides with at least one of a center of gravity of the movable portion, a center of a driving force of the movable portion, and a center of translational forces of the linear elastic members.

Claim 15 (Previously Presented): A method of producing an actuator for a pickup including: a fixed portion; a movable portion designed to be movable in each of a focusing direction extending along an optical axis of an objective lens and a tracking direction substantially perpendicular to the focusing direction, to hold the objective lens; and a plurality of linear elastic members of five or more each having ends connected to the movable portion and the fixed portion, respectively,

the method, comprising:

equalizing the plurality of the linear elastic members to one another in length dimension between the fixed portion and the movable portion,

locating the ends of the plurality of the linear elastic members on a virtual circle formed on a plane by being projected onto a plane including both the focusing direction and the tracking direction, respectively;

making a center of translational forces of the linear elastic members coincide with a center of the virtual circle which is defined as a rolling center, and

making at least one of a center of gravity of the movable portion and a center of a driving force of the movable portion coincide with the rolling center.

Claim 16 (Withdrawn): A method of producing an actuator for a pickup including: a fixed portion; a movable portion designed to be movable in each of a focusing direction extending along an optical axis of an objective lens and a tracking direction substantially perpendicular to the focusing direction, to hold the objective lens; and four linear elastic members each having ends connected to the movable portion and the fixed portion, respectively,

the method, comprising:

locating the ends of the four linear elastic members on a virtual circle formed on a plane by being projected onto a plane including both the focusing direction and the tracking direction;

ensuring that line segments linking the ends with one another assume substantially a trapezoidal shape; and

making at least one of a center of gravity of the movable portion, a center of a driving force of the movable portion, and a center of translational forces of the linear elastic members coincide with a center of the virtual circle defined as a rolling center.

Claim 17 (Previously Presented): The method of producing the actuator for the pickup according to Claim 15, further comprising:

installing the linear elastic members in a mold for molding the fixed portion and the movable portion; and

insert-molding the actuator for the pickup through injection of a molten resin from an injection port of the mold.

Claim 18 (Withdrawn): The method of producing the actuator for the pickup according to Claim 16, further comprising:

installing the linear elastic members in a mold for molding the fixed portion and the movable portion; and

insert-molding the actuator for the pickup through injection of a molten resin from an injection port of the mold.